

APPLICATION
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TITLE: CATALOG SEARCH AGENT

APPLICANT: PETER SCHWARZE, KARIN BRECHT-TILLINGER
And JENS KISKER

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CATALOG SEARCH AGENT

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application Serial No. 60/427,509, filed on November 18, 2002, and entitled, "Web Service Integration".

BACKGROUND

[0002] This invention relates to catalog searching by software application agents.

[0003] Businesses and individuals often rely on catalogs to determine what products or services may be obtained from a particular supplier, and to receive information (such as price, available colors and styles, etc.) about those products and services. Electronic catalogs provide a number of advantages for companies that wish to provide information about their products and services to potential customers. For example, electronic catalogs can be updated and distributed more easily than can paper catalogs. Electronic catalogs can also provide automated searching capabilities so that customers can more readily find the information they seek.

[0004] Each supplier generally produces its own catalog, and each of these catalogs may be formatted in a different

manner than other catalogs. Also, a catalog may contain information not contained in other catalogs for similar products or services. Therefore, it can be difficult for a potential customer who is trying to find a product but is not focused on a single supplier, to receive concise, usable information about the product, especially where the information comes from a number of vendors.

SUMMARY

[0005] A computer-based system that provides services for searching and displaying catalog items. The system enables a user to pass a request to one or more catalog servers and display aggregated results in a user interface. Furthermore, the system enables the user to select one or more items from the user interface and transfer the one or more items to a procurement system for additional processing.

[0006] A user may use a client computer to compose and send a request for one or more catalog items, e.g., in a text string, to a catalog search agent in the system, e.g., over a Web portal. The catalog search agent may then format the request according to a catalog interface protocol, e.g., the Open Catalog Interface (OCI), and send the formatted request to a plurality of catalog servers.

Formatting the request may include generating multiple formatted requests, each formatted request including a URL for one of the catalog servers and one or more query terms in one or more fields according to the catalog interface protocol.

[0007] The catalog search agent may take the responses received from the catalog servers, and parse the responses according the protocol to obtain the results. The catalog search agent may then send the results from the plurality of catalog servers to the user. The results may be formatted to be displayed in a single display screen.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Figure 1 is a block diagram of a computer-based system that provides services for searching and displaying items from multiple catalogs.

[0009] Figure 2 shows exemplary fields for an OCI (Open Catalog Interface) outbound interface.

[0010] Figure 3A shows exemplary fields for an OCI inbound interface.

[0011] Figure 3B shows an exemplary OCI-compliant HTML response page.

[0012] Figure 4 is a flowchart describing a multi-catalog search.

[0013] Figure 5 shows a search screen display.

[0014] Figure 6 shows a search result screen display.

[0015] Figure 7 illustrates a background process at the application server that receives the single responses from each of the catalogs.

DETAILED DESCRIPTION

[0016] Figure 1 shows a computer-based system 100 that provides services for searching and displaying items from multiple catalogs. The system enables a user to pass a request (e.g., as a search string) to one or more catalog servers 105 and display aggregated results in a user interface (UI). The system 100 may also enable to the user to select one or more items from the UI and transfer the items to an electronic procurement system 110 for additional processing, such as generating a purchase order for selected item(s).

[0017] The system includes an application server 115 that may be connected to a client 120 through a network 125, e.g., a LAN (Local Area Network), WAN (Wide Area Network), or Web portal. Users may interact with the application server 119 through the client 120, e.g., a personal computer (PC) or a terminal connected directly to the application server. The application server 115 may

communicate with the catalog servers 105 via an external network, e.g., the Internet 130.

[0018] The application server 115 may include a search agent 135 and the electronic procurement system 110. In an alternative embodiment, multiple application servers may be configured and the search agent 135 and the electronic procurement system 110 may reside on different servers.

[0019] The electronic procurement system 110 may provide purchase order processing and administrative functions for buyers and suppliers. For example, the electronic procurement system 110 may use Internet technology to streamline, manage and report on corporate purchasing functions.

[0020] The electronic procurement system 110 may implement software applications tailored to a corporation's specific purchasing agreements, internal procedures and business rules. In an embodiment, the electronic procurement system 110 may enable self-service purchasing for employees of the enterprise implementing the application server, allowing the employees to select and purchase products from the client through using a Web browser 137 at the client.

[0021] The catalog servers 105 may be provided by multiple external vendors. A catalog server may include a

catalog database 140 that stores information regarding available products and services, and a catalog application 145 that searches the catalog database based on a request and compiles and returns results based on the request. The catalog application 145 may utilize one or more catalog search methodologies (e.g. fuzzy logic and other artificial intelligence techniques) to retrieve information from the catalog database 140. The format of the catalog database 140 may be varied. For example, the catalog database 140 may reside in a relational database or an object-orientated database.

[0022] The electronic procurement system 110 and the catalog applications 145 may communicate using a catalog interface protocol. In an embodiment, the Open Catalog Interface (OCI) developed by SAP AG of Walldorf, Germany is used.

[0023] The OCI uses standard Internet protocols, e.g., HTTP (Hypertext Transfer Protocol), to exchange information between the application server and the catalogs. Using the OCI, the electronic procurement system 110 may send a request in an OCI-compliant format to a catalog application, and the catalog application may return a response page, including results compiled in response to the request, in an OCI-compliant format.

[0024] The OCI includes an outbound section and an inbound section. The outbound section consists of information that is sent to the catalog application by the electronic procurement system. This information originates in the electronic procurement system, where it is created and maintained. The information may be stored in fields in a table. Every field contains a name-value pair and has a type. The information stored in the table for each catalog server may include the following information: the catalog URL, which should refer to the location of the catalog application; catalog specific fields, such as username and password; and a return URL used by the catalog server to return to the electronic procurement system from the catalog application. Figure 2 shows exemplary fields for an OCI outbound interface.

[0025] Using this information, the electronic procurement system 110 constructs a URL call to the catalog application and may redirect the client browser 137 to this URL. In an embodiment, the catalog may be accessed using the HTTP methods GET or POST, which includes the outbound interface field data. The catalog application then parses and decodes this data and may perform a search based on the data.

[0026] The inbound section consists of information that is sent to the electronic procurement system 110 by the catalog application 145. The inbound section may be sent back to the electronic procurement system in an OCI-compliant, e.g., an HTML page or an XML file. For each item selected in the catalog and sent to the electronic procurement system, all required fields must be sent, along with the optional fields. The fields may include the following information: a description of the item; a quantity to add; a unit of measure of the item; a price; a currency; a product master number in the electronic procurement system; and a number of days until the item will be available. Figure 3A shows exemplary fields for an OCI inbound interface, and Figure 3B shows an exemplary HTML response page.

[0027] The system 100 may enable a user at the client 120 to search several catalogs by entering a single search string. Figure 4 is a flowchart describing a multi-catalog search operation according to an embodiment.

[0028] The search agent 135 may display a search screen 500 such as that shown in Figure 5, in response to a request from the electronic procurement system 110 or in response to a file menu command executed at the client 120 (block 405). In an embodiment, the search screen 500

provides a UI that includes a text input field 505 that may be used for entering search criteria, a start button 510 that initiates a search process, and a close button 515 that terminates the search screen 500.

[0029] The user enters the request in the text input field (block 410). The text input field 505 accepts a search string, e.g., a free-form string, which may be any combination of alphanumeric characters or search terms requiring no particular syntax. For example, the search string may include the name of an item, a part number for an item, or any descriptive attribute of the item. In an embodiment, once one or more search terms have been entered in the text input field 505 and the user selects the start button 540, the search agent 135 may send search requests based on the input text string to one or more of the catalog servers for execution. The search agent may populate fields in an OCI outbound interface with terms entered in text input field and transmit the information using the HTTP GET or POST method.

[0030] In an embodiment, the search agent 135 may execute a search algorithm for sending search requests and receiving search results. Upon selection of the start button 505 on search screen 500, the search agent may determine the proxy settings of the web browser 137 at the

client displaying the search screen. The search agent may determine catalogs servers accessible to a particular user for electronic purchases from the user's web browser proxy settings. The search agent may then access information accepted by the text input field on the search screen and store this information in a communications protocol that may be interpreted by catalog servers, e.g. the OCI protocol (block 420). The search agent may execute HTTP GET or POST operations to one or more connected catalog servers (block 425) and pass search requests to the catalog servers (block 430). In an embodiment, search agent 16 may pass the OCI outbound interface for the catalog application 145 processing instead of redirecting the client browser 137.

[0031] The search agent 135 may receive search results from the one or more catalog servers according to the communication protocol (block 435), e.g., an OCI outbound interface including an HTML or XML response page with the appropriate required (and optional) fields. The search agent may then parse the response page to obtain the search results and store the search results in a generic consistent format in a shared area of memory (block 440). Once all the catalog servers have responded with search results, the search agent may display the aggregated search

results in a single search result screen 600, as shown in Figure 6.

[0032] The search agent 135 may receive the result pages asynchronously from the catalog servers in a background process. As shown in Figure 7, the background process 705 receives the single responses from each of the catalogs and stores them in a shared memory 710. When all the catalogs have returned their data, a flag 715 that indicates that the search is done is set in the memory. This flag may be read periodically by the generic results screen.

[0033] In an embodiment, the results screen may enable the user to terminate the search by, e.g., pressing a button that writes a "cancel flag" 720 to the shared memory. This flag may be periodically evaluated after each response from a catalog.

[0034] The result screen 600 provides an aggregated, unified display of retrieved catalog data items from one or more catalog servers for display at the client. In an embodiment, the result screen may have a user-selectable option fields 605 (e.g., check boxes) to select one or more items retrieved from catalog servers for additional processing. In addition, in some embodiments, the result screen may provide sortable display columns indicating the product or service description 610 for retrieved catalog

items, the source 615 of catalog data, price information 620 for retrieved catalog items, and one or more data entry fields 625 associated with catalog items that the user may use to indicate the quantity of each item for electronic purchase. The search agent may indicate ratings based on, e.g., price or some other attribute, and may apply customized business rules for the enterprise, e.g., retaining only the lowest priced items.

[0035] Upon selection of items via user selectable option fields 605 and selecting send button 630 (block 450), the search agent may format the selected items in a OCI outbound interface (e.g., a requisition page) and transmit the page to the procurement system 110 for requisition processing.

[0036] A number of embodiments have been described. Nevertheless, it will be understood that various modifications may be made without departing from the spirit and scope of the invention. For example, blocks in the flowcharts may be skipped or performed out of order and still produce desirable results. Accordingly, other embodiments are within the scope of the following claims.